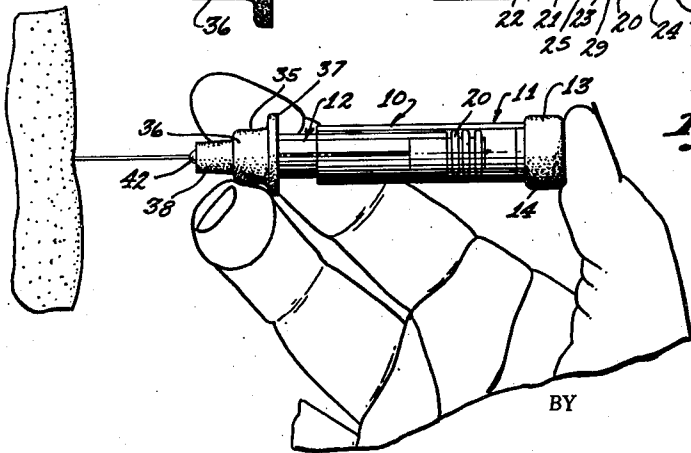
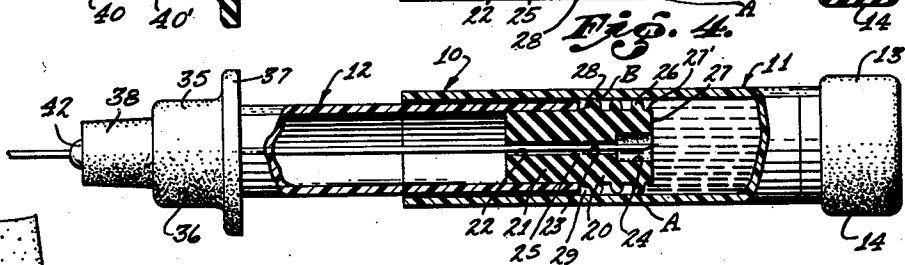
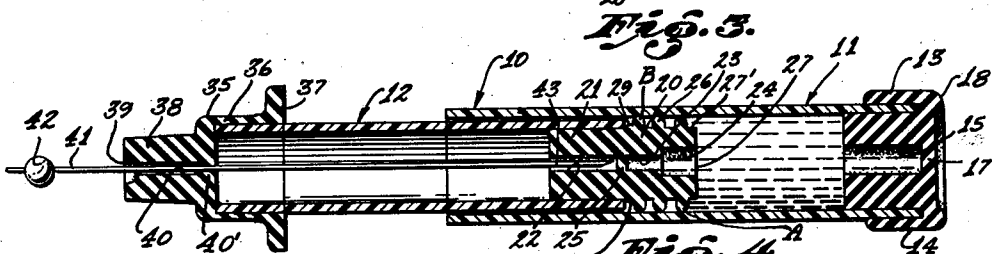
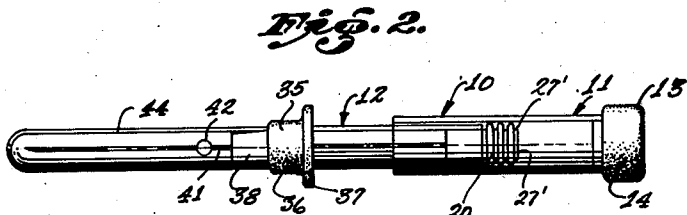
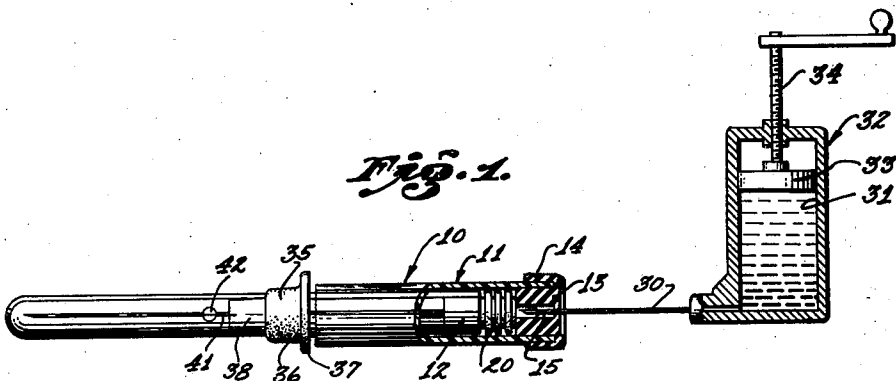


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AMPOULE SYRINGE

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AMPOULE SYRINGE

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5 Claims. (Cl. 128—220)

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This invention relates to syringes.

The general object of the invention is to provide an improved syringe which is simple in construction, efficient in use and which can be economically manufactured.

A more specific object of the invention is to provide a syringe including a barrel having a novel plunger therein.

Another object of the invention is to provide a novel piston cork for use in a syringe.

A further object of the invention is to provide a novel sliding plunger for use in a disposable syringe.

Other objects and advantages of the invention will be apparent from the following description taken in connection with the accompanying drawings, wherein

Fig. 1 is an extended side elevation, partly in section, showing my syringe and showing an apparatus for filling the medicinal ampule or container;

Fig. 2 is a side elevation showing the completed syringe;

Fig. 3 is an enlarged, central sectional view showing the syringe before it is prepared for use;

Fig. 4 is an elevation, partly in section, showing the syringe after it has been prepared for use, and

Fig. 5 is a fragmentary perspective view of the syringe in use.

Referring to the drawing by reference characters, I have shown my invention as embodied in a syringe which is indicated generally at 10. As shown the syringe includes a barrel forming ampule 11 and a plunger 12. The barrel and plunger may be of transparent glass, plastic or other suitable material and both are preferably cylindrical tubes with the plunger 12 of slightly less external diameter than the internal diameter of the ampule.

As shown the ampule is provided with a closure 13 which includes a body having an external ampule engaging skirt 14, with an internal axial recess 15 closed by a diaphragm 17. The closure 13 includes a peripheral bead 18 engageable by the thumb of the user to prevent slipping during injection.

The plunger 12 has a piston stopper 20 therein. The stopper includes a body 21 arranged

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in the ampule end and having an outwardly facing recess 22 therein. The stopper also has an interior facing recess 23 with an enlarged recess 24 communicating with the recess 23. The recesses 21, 22 and 23 are coaxial and aligned with the recess 15. A diaphragm 25 separates the recesses 22 and 23.

The stopper 20 is provided with a series of beads 25 which are spaced apart, with the innermost bead A spaced from the end 27 of the stopper to form a shoulder 27'. The closure 13 and the stopper 20 are made of either natural or synthetic rubber and the parts are molded so that the skirt 14 tightly engages the exterior of the ampule. The body 21 of the stopper 20 is normally larger than the bore of the ampule 11 so that the stopper must be forced into place and as a result, due to the expansion of the rubber, there is a slight bulge at 28 when the stopper is pushed into the ampule. This provides a circumferential groove 29 between the outer bead B and the adjacent end of the ampule.

In manufacturing the syringe, the piston cork 20 is inserted in one end of the ampule as shown in Fig. 1, with the closure 13 in place. A hypodermic needle 30, which communicates with the chamber 31 of a filling apparatus 32 is then passed through the diaphragm 17 and the plunger 33 of the filling apparatus is advanced as by turning a threaded member 34. As the medicinal material, which may be penicillin-oil-wax, enters the ampule the piston plunger 20 is moved forwardly a distance proportional to the amount of material to be injected until it reaches the desired position such, for example, the position shown in Fig. 2, whereupon the needle 30 is withdrawn and the diaphragm 17, due to the resiliency of the rubber, springs back to place, filling the hole through which the needle passed, thereby causing the contents to remain in a sterile condition.

The plunger 12 is provided with a front end closure 35 which is in the nature of a cap, having a skirt 36 and a peripheral bead 37, which may be grasped by the fingers of the operator's hand. The front member 35 includes a tip 38, having a hemispherical recess 39 in the front end and having a recess or hole 40 therein. The inner end of the recess is closed by a diaphragm 40'. A needle 41 extends through the hole 40

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and diaphragm 40'. The needle has a hemispherical protuberance 42 thereon. The inner end of the needle 43 is arranged in the recess 22 and is spaced from the diaphragm 25.

The front member 35 is made of rubber and the tip 38 supports a cap 44 which protects the needle against contamination. The closure cap 44 may be made of flexible plastic material and in use this closure cap 44 is first removed after which the protuberance 42 is moved into the recess 39, carrying with it the needle and causing the needle to pierce the diaphragm 25, thereby establishing communication between the interior of the ampule and the needle. The parts thus assume the position shown in Fig. 4, whereupon the operator may grasp the syringe in the manner shown in Fig. 5 and may insert the needle as shown in this figure and may then, by grasping the bead 37 with two fingers and engaging the closure 13 with the thumb make the desired insertion and injection.

After the needle has been inserted into the patient, the ampule 11 may be slightly advanced along the piston cork and then withdrawn and any discoloration due to the presence of blood in the ampule will indicate that the needle is in a blood vessel so that the operator may withdraw the needle and make a fresh insertion.

The arrangement of the beads A and B permits easy movement of the piston relative to the ampule. When the piston moves in and out of the ampule the beads are free to shift slightly and move almost without friction along the ampule wall. If the beads were close together the shifting would cause one bead to strike another and this would cause a jamming action, which is objectionable to the surgeon.

It will be noted that the inner pointed end of the needle is spaced on the diaphragm 25 so that it requires that the needle move inside the front member 30 to permit the syringe to be prepared for use. This movement of the needle I deem of great importance inasmuch as it enables me to provide a syringe which is normally hermetically sealed yet may be readily prepared for injection by merely taking off the cap 44 and advancing the needle into the plunger so that the diaphragm 25 is pierced.

Having thus described my application, I claim:

1. A medicament holding ampule, said ampule comprising a cylindrical body, a closure at one end of said body, said closure including a body portion having a skirt engaging the rear end portion of the ampule, said closure having an axial recess therein, a diaphragm closing one end of said recess, a plunger in and slidable in relation to said ampule, said plunger comprising a cylindrical, tubular body having a piston stopper in one end thereof, said piston stopper comprising a soft, resilient body portion inserted in said plunger and having spaced beads thereon, said spaced beads slidably engaging the interior wall of the ampule, the innermost of said beads being spaced from the end of the stopper to provide a shoulder, there being a peripheral channel between the outermost bead and the adjacent end of the plunger, said piston stopper having an axial recess therein with a diaphragm closing one end of said recess and a front member on said plunger.

2. A syringe including a medicament holding ampule, said ampule comprising a cylindrical body, a closure at one end of said body, said closure having an axial recess therein, a diaphragm closing one end of said recess, a plunger slidable

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in said ampule, said plunger comprising a cylindrical, tubular body having a piston stopper in one end thereof, said piston stopper comprising a soft, resilient body portion inserted in said plunger and having spaced beads thereon, said piston stopper having axial recesses therein with a diaphragm between said recesses, a front member on said plunger, said front member having a hole therethrough, a needle carried by said front member and extending through said hole, the inner end of said needle being disposed in the outermost recess of said piston stopper and spaced from the diaphragm of the piston stopper.

3. A syringe including a medicament holding ampule, said ampule comprising a cylindrical body, a closure at one end of said body, said closure having an axial recess therein with a diaphragm closing one end of said recess, a plunger slidable in said ampule, said plunger comprising a cylindrical, tubular body having a piston stopper in one end thereof, said piston stopper comprising a soft, resilient body portion inserted in said plunger and having spaced beads thereon, said spaced beads slidably engaging the interior wall of the ampule, the innermost of said beads being spaced from the end of the stopper to provide a shoulder, there being a peripheral channel between the outermost bead and the adjacent end of the plunger, said piston stopper having axial recesses therein with a diaphragm between said recesses, a front member on said plunger, said front member having a hole therethrough, a needle carried by said front member and extending through said hole, the inner end of said needle being disposed in the outermost recess of said piston stopper and spaced from the diaphragm of the piston stopper.

4. A syringe including a medicament holding ampule, said ampule comprising a cylindrical body, a closure at one end of said body, said closure including a body portion having a skirt engaging the rear end portion of the ampule, said closure having an axial recess therein, a diaphragm closing the inner end of said recess, a plunger slidable in said ampule, said plunger comprising a cylindrical, tubular body having a piston stopper in one end thereof, said piston stopper comprising a soft, resilient body portion inserted in said plunger and having spaced beads thereon, said spaced beads slidably engaging the interior wall of the ampule, the innermost of said beads being spaced from the end of the stopper to provide a shoulder, there being a peripheral channel between the outermost bead and the adjacent end of the plunger, said piston stopper having axial recesses therein with a diaphragm between said recesses, a front member on said plunger, said front member including a tapering tip portion and a skirt portion about the end portion of the plunger and having a peripheral bead on the skirt portion thereof, said front member having a hole therethrough, a needle carried by said front member and extending through said hole, the inner end of said needle being disposed in the outermost recess of said piston stopper and spaced from the diaphragm of the piston stopper, a protuberance on said needle in advance of said tapered tip and a cap on said tapered tip and surrounding the outer portion of said needle.

5. A syringe including a medicament holding ampule, said ampule comprising a cylindrical body, a closure at one end of said body, said closure having an axial recess therein, a diaphragm closing one end of said recess, a plunger slidable in said ampule, said plunger comprising

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a cylindrical, tubular body having a piston stopper in one end thereof, said piston stopper having an axial recess therein, a diaphragm closing the inner end of said recess, a front member on said plunger, said front member having a hole therethrough, a needle carried by said front member and slidably extending through said hole, the inner end of said needle being disposed in the outermost recess of said piston stopper and spaced from the diaphragm of the piston stopper, said needle being movable to pierce said diaphragm to thereby place said needle in communication with the interior of the ampule.

ARTHUR E. SMITH.

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